

CLAIMS:

What is claimed is:

1. A method of transferring a pattern to a thin film of radiation-sensitive material on a substrate using photolithography comprising:
 exposing said thin film to a radiation source in a liquid immersion lithography system; and
 drying said substrate following said exposure in said liquid immersion lithography system to remove an immersion fluid from said substrate.
2. The method of claim 1, wherein said drying comprises rotating said substrate.
3. The method of claim 1, wherein said drying comprises rotating said substrate at a first rotation rate for a first period of time, and rotating said substrate at a second rotation rate for a second period of time.
4. The method of claim 3, wherein said first rotation rate facilitates distributing said immersion fluid on said thin film, and said second rotation rate facilitates removing said immersion fluid from said thin film.
5. The method of claims 1, 2 or 3, wherein said drying comprises dispensing a drying fluid on said substrate.
6. The method of claim 5, wherein said drying comprises dispensing isopropyl alcohol on said substrate.
7. The method of claim 1, further comprising:
 baking said substrate following said drying in order to promote acid diffusion in said thin film.
8. The method of claim 1, wherein said drying said substrate following said exposure reduces non-uniformity of critical dimension of said pattern in said thin film.

9. The method of claim 1, wherein said exposing comprises exposing a radiation-sensitive material including at least one of a 248 nm photoresist, a 193 nm photoresist, a 157 nm photoresist, an extreme ultraviolet (EUV) photoresist, an anti-reflective coating, a contrast enhancement material, a top coat for protecting a photoresist, and a top coat for eliminating thin film interference during exposure.

10. A method of treating an exposed thin film on a substrate following liquid immersion lithography comprising:

drying said substrate to remove immersion liquid from said exposed thin film on said substrate.

11. The method of claim 10, further comprising:

baking said thin film following said drying in order to cure said exposed thin film.

12. The method of claim 10, wherein said drying said substrate following said exposure reduces non-uniformity of critical dimension of said pattern in said thin film.

13. The method of claim 10, wherein said drying comprises rotating said substrate.

14. The method of claim 10, wherein said drying comprises rotating said substrate at a first rotation rate for a first period of time, and rotating said substrate at a second rotation rate for a second period of time.

15. The method of claim 14, wherein said first rotation rate facilitates distributing said immersion fluid on said thin film, and said second rotation rate facilitates removing said immersion fluid from said thin film.

16. The method of claims 10, 13 or 14, wherein said drying comprises dispensing a drying fluid on said substrate.

17. The method of claim 5, wherein said drying comprises dispensing isopropyl alcohol on said substrate.

18. The method of claim 10, wherein said exposing comprises exposing a radiation-sensitive material including at least one of a 248 nm photoresist, a 193 nm photoresist, a 157 nm photoresist, an extreme ultraviolet (EUV) photoresist, an anti-reflective coating, a contrast enhancement material, a top coat for protecting a photoresist, and a top coat for eliminating thin film interference during exposure.

19. The method of claim 1, further comprising:
forming a thin film of radiation-sensitive material on said substrate prior to said exposing;
baking said substrate following said drying; and
developing said thin film on said substrate to form said pattern in said thin film by subjecting said substrate to a developing solution.

20. The method of claim 19, wherein said forming comprises:
coating said substrate with said thin film; and
baking said substrate in order to cure said thin film.

21. A system for patterning a thin-film of radiation-sensitive material on a substrate for semiconductor manufacturing comprising:
a liquid immersion lithography system configured to expose said thin film to a pattern; and
a drying system coupled to said liquid immersion lithography system and configured to dry said thin film following exposure by substantially removing immersion fluid from said thin film.

22. The system of claim 21, further comprising a track system coupled to said liquid immersion lithography system and configured to coat said substrate with said thin film prior to said exposure, and develop said pattern in said thin film following said exposure,

wherein said drying system is coupled to at least one of said liquid immersion system and said track system.

23. The system of claim 22, wherein said liquid immersion lithography system comprises at least one of a radiation source, an imaging system, a scanning system, a projection lens system, and a substrate holder.

24. The system of claim 22, wherein said drying system is configured to substantially remove at least one of water, and a perfluoropolyether (PFPE).

25. The system of claim 22, wherein said track system comprises at least one of a coating system, a post application (PAB) unit, a post exposure bake (PEB) unit, a cooling unit, a developing unit, a rinsing unit, and a cleaning unit.

26. The system of claim 22, wherein said drying system facilitates drying said substrate to remove immersion fluid from said substrate following said exposure in said liquid immersion lithography system.

27. The system of claim 22, wherein said drying system is configured to rotate said substrate.

28. The system of claim 27, wherein said drying system is configured to rotate said substrate at a first rotation rate for a first period of time, and rotate said substrate at a second rotation rate for a second period of time.

29. The system of claim 28, wherein said first rotation rate facilitates distributing said immersion fluid on said thin film, and said second rotation rate facilitates removing said immersion fluid from said thin film.

30. The system of claims 22, 27, or 28, wherein said drying system is configured to dispensing a drying fluid on said substrate.

31. The system of claim 30, wherein said drying system is configured to dispense isopropyl alcohol.

32. The system of claim 22, wherein said system is configured to pattern at least one of a 248 nm photoresist, a 193 nm photoresist, a 157 nm photoresist, an extreme ultraviolet (EUV) photoresist, an anti-reflective coating, a contrast enhancement material, a top coat for protecting a photoresist, and a top coat for eliminating thin film interference during exposure.

33. A semiconductor integrated circuit comprising:
a plurality of transistors formed in said semiconductor integrated circuit, each of said plurality of transistors having a lateral dimension of less than 1000 nm and including a plurality of features having a critical dimension of less than 65 nm, wherein said critical dimension of each of the plurality of features is substantially uniform throughout substantially the entire semiconductor-integrated circuit.

34. A semiconductor integrated circuit produced from a method claimed in any one of claims 1-20.